TRANSMITTAL OF APPEAL BRIEF (Small Entity)

Docket No.
POM-12502/29

In Re Application Of: Mazumder et al

Serial No.	Filing Date	Examiner	Group Art Unit
09/916,566	July 27, 2001	E. Frank	2125

Invention: DIRECT METAL DEPOSITION APPARATUS UTILIZING RAPID-RESPONSE DIODE LASER SOURCE

TO THE COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on: March 19, 2004

Applicant is a small entity under 37 CFR 1.9 and 1.27.

A verified statement of small entity status under 37 CFR 1.27:

- ☐ is enclosed.
- ☐ has already been filed in this application.

The fee for filing this Appeal Brief is: $165.00

- ☒ A check in the amount of the fee is enclosed.
- ☒ The Director has already been authorized to charge fees in this application to a Deposit Account.
- ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 07-1180

Signature

Dated: May 19, 2004

John G. Posa
Reg. No. 37,424
Gifford, Krass, Groh et al
280 N. Old Woodward Ave., Suite 400
Birmingham, MI 48009
Tel. 734/913-9300
Fax 734/913-6007

I certify that this document and fee is being deposited on 5-19-04 with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Signature of Person Mailing Correspondence

Sheryl L. Hammer

Typed or Printed Name of Person Mailing Correspondence

cc:

P30SMALL/REV03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of: Mazumder et al.

Serial No.: 09/916,566 Group No.: 2125

Filed: July 27, 2001 Examiner: E. Frank

For: DIRECT METAL DEPOSITION APPARATUS UTILIZING RAPID-RESPONSE DIODE LASER SOURCE

APPELLANTS' BRIEF UNDER 37 CFR §1.192

Mail Stop Appeal Brief
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I. Real Party in Interest

The real party and interest in this case is The P.O.M. Group, a Michigan corporation, by assignment.

II. Related Appeals and Interferences

There are no appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims

The present application was filed with 1 claim. Claims 2-8 were added in July 2003. Claim 2 has been canceled by after-final amendment herein; accordingly, claims 1 and 3-8 are under appeal.

IV. Status of Amendments Filed Subsequent Final Rejection

An after-final amendment is attached herewith.

GIFFORD, KRASS, GROH, SPRINKLE, ANDERSON & CITKOWSKI, P.C. 280 N. OLD WOODWARD AVENUE, STE. 400, BIRMINGHAM, MICHIGAN 48009-5394 (248) 647-6000

GIFFORD, KRASS, GROH, SPRINKLE, ANDERSON & CITKOWSKI, P.C. 280 N. OLD WOODWARD AVENUE, STE. 400, BIRMINGHAM, MICHIGAN 48009-5394 (248) 647-6000

V. Concise Summary of the Invention

This invention incorporates one or more diode lasers for the high-power CO_2 or Nd-YAG lasers currently used in closed-loop DMD systems (Specification, page 3, lines 11-12). Being semiconductor-based, such devices are almost instantaneously responsive to the electrical input. As such, a DMD system driven by a diode laser according to the invention provides a much faster response compared to other sources (Specification, page 3, lines 12-15). The faster response time, in turn, provides for enhanced dimensional control and capability to produce intricate components with better dimensional accuracy (Specification, page 3, lines 15-17).

VI. Concise Statement of Issues Presented For Review

1. Are claims 1-8 unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,046,426 to Jeantette et al. in view of U.S. Patent No. 6,526,327 to Kar et al.?

VII. Grouping of Claims for Each Ground of Rejection Which Appellants Contend

Appellants believe the following groups of claims represent patentably distinct inventions which should be given independent consideration on appeal:

Group I: Claims 1, 3 and 4, wherein claims 3 and 4 stand or fall with claim 1; and

Group II: Claims 5-8, wherein claims 6-8 stand or fall with claim 5.

VIII. Argument

A. Group I - Claims 1, 3 and 4 wherein claims 3 and 4 stand or fall with claim 1.

Claim stands rejected under 35 U.S.C. §103(a) over Jeantette et al. ('426) in view of Kar et al. ('327). While the Examiner concedes that Jeantette et al. includes numerous deficiencies in meeting the limitations of the instant claims, Kar is added on the grounds that it uses a diode laser in "an analogous system." Applicant respectfully disagrees with this determination.

In rejecting claims under 35 U.S.C. §103, the Examiner must provide a reason why one having ordinary skill in the pertinent art would have been led to combine the cited references to arrive at

GIFFORD, KRASS, GROH, SPRINKLE, ANDERSON & CITKOWSKI, P.C. 280 N. OLD WOODWARD AVENUE, STE. 400, BIRMINGHAM, MICHIGAN 48009-5394 (248) 647-6000

Applicant's claimed invention. There must be something *in the prior art* that suggests the proposed combination, other than the hindsight gained from knowledge that the inventor choose to combine these particular things in this particular way. Uniroyal Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. 1988). The Examiner is also required to make specific findings on a suggestion to combine prior-art references. In Re Dembeczak, 175 F.3d 994, 1000-01, 50 USPQ2d 1614, 1617-19 (Fed. Cir. 1999).

Claim 1 includes a controllable semi-conductor diode laser to form a melt pool, an optoelectric sensor operative to output electrical signal as a function of a physical attribute of a part being built, and a feedback controller operative to automatically adjust the rate of material deposition as a function of the electric signal by modulating the laser to control the power of the beam (as amended). Not only has the Examiner failed to provide any justification from the prior art to combine the patents of Jeantette and Kar, Appellants contend that the Examiner has used the wrong definition of "modulation." There is no teaching or suggestion *from the prior art* to combine these references, such that *prima facie* obviousness has not been established. U.S. Patent No. 6,046,426 to Jeantette et al. resides in a laser cladding system with components to ensure a uniform and continuous flow of powdered materials as well as to focus and locate the flow of powdered materials with respect to a laser beam which results in the melting of the powdered material. U.S. Patent No. 6,526,327 to Kar et al. is directed to a one-step rapid manufacturing process is used to create three dimensional prototyping parts. Material such as metal, ceramics and the like powder, and wire, and the like, is delivered to a laser beam-material interaction region where it is melted and deposited on a substrate. The melted and deposited material is placed on a XYZ workstation. Three-dimensional parts are created by moving the XYZ workstation relative to the laser beam while simultaneously feeding powdered alloys, first in the XY and then in the Z plane.

Although, arguably, Jeantette et al. includes some form of feedback, it is not a system that monitors a physical attribute, and there is no disclosure whatsoever of a diode laser source. Although Kar makes mention of a diode laser source, it is silent with respect to feedback. Accordingly, there is no legal basis for combining these references for the purposes of rejection. In addition, whereas the Examiner has chosen to use a standard dictionary to come up with a definition for the term "modulation," one of skill in the art would either know of the definition already, or refer to a more

GIFFORD, KRASS, GROH, SPRINKLE, ANDERSON & CITKOWSKI, P.C. 280 N. OLD WOODWARD AVENUE, STE. 400, BIRMINGHAM, MICHIGAN 48009-5394 (248) 647-6000

specialized electronics-related reference. Attached hereto, as Exhibit A, is a page from the textbook "Microelectronics" by Millman, McGraw-Hill Book Co., 1979, which defines modulation as "the variation of a high-frequency-carrier characteristic proportional to a lower-frequency signal." Attached hereto as Exhibit B, is a page taken from the Van Nostrand Scientific Encyclopedia, Fourth Edition, wherein modulation is defined as "the process or result of the process whereby some characteristic of one wave is varied in accordance with another wave." Thus, the Examiner's rudimentary explanation that modulation can simply mean turning something on and off (presumably even a single time) is not persuasive with respect to the limitations of the claims at issue.

In addition, it is interesting to note that while the Examiner feels more explanation is due on the part of Applicant in explaining "modulation," "the use of a continuously variable beam attenuator" as cited in Jeantette et al. is, in the Examiner's opinion, "equivalent to modulating the laser." Applicant respectfully disagrees, since a variable beam attenuator would, to one of skill, simply denote some form of intensity control having nothing to do with frequency, modulation, duty cycle, or the like. In addition, given that Jeantette et al. does not disclose any form of optical source that could be modulated in the kilohertz range, i.e., up to 20 KHz, this reference falls sort for that reason as well. Given that even if these two references were combined, which Applicant contends they should not be, the instant claims would not result.

B. Group II - Claims 5-8

Method claims 5-8 stand rejected under 35 U.S.C. §103(a) over Jeantette et al. (PN 6,046,426) in view of Kar et al. (PN 6,526,327). Although the Examiner contends that method claims 5-8 can be rejected because they have "the same functional limitations as systems claims 1-4," this is not the standard. Rather, whereas certain functional limitations of apparatus claims may, on occasion, be given reduced patentable weight, steps of a process must be given ***full weight*** in a method claim. Accordingly, given that the Examiner has, in essence, failed to examine method claims 5-8, they should be deemed allowable on at least these grounds.

Conclusion

In conclusion, for the arguments of record and the reasons set forth above, all pending claims of the subject application continue to be in condition for allowance and Appellants seek the Board's concurrence at this time.

Respectfully submitted,

By: _____

Date: May 19, 2004

John G. Posa
Reg. No. 34,424
Gifford, Krass, Groh, Sprinkle,
Anderson & Citkowski, P.C.
280 N. Old Woodward, Suite 400
Birmingham, MI 48009
(734) 913-9300

GIFFORD, KRASS, GROH, SPRINKLE, ANDERSON & CITKOWSKI, P.C. 280 N. OLD WOODWARD AVENUE, STE. 400, BIRMINGHAM, MICHIGAN 48009-5394 (248) 647-6000

APPENDIX A

CLAIMS ON APPEAL

1. A system for automatically controlling the build-up of material on a substrate, comprising:

a controllable semiconductor diode laser having a beam directed to a localized region of the substrate so as to form a melt pool thereon;

a material feeder for feeding material into the melt pool to be melted by the beam to create a deposit having a physical attribute;

an optoelectric sensor operative to output an electrical signal as a function of the physical attribute; and

a feedback controller operative to automatically adjust the rate of material deposition as a function of the electric signal by modulating the laser to control the power of the beam.

3. The system of claim 1, wherein the modulation of the laser is in the kilohertz range.

4. The system of claim 1, wherein the modulation of the laser is up to 20 kHz.

5. A method of depositing material on a substrate, comprising the steps of:

heating the substrate with a high-power, rapid-response diode laser to create a melt pool in a laser interaction zone;

feeding material into the melt pool to create a deposit having a physical dimension;

monitoring the laser interaction zone to generate an optical signal indicative of the physical dimension; and

controlling the deposition using the optical signal.

6. The method of claim 5, wherein the deposition is controlled by modulating the laser.

7. The method of claim 6, wherein the modulation of the laser is in the kilohertz range.

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8. The method of claim 6, wherein the modulation of the laser is up to 20 kHz.